

STRATEGY RESEARCH PROJECT

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GEOPOLITICAL ASPECTS OF WEAPONIZING SPACE

BY

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ABSTRACT

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Exploiting advantages provided by space-based assets is vital to both the civilian and military communities. Corporate investment in satellites has increased private sector capabilities and reduced unit costs. Government investment in satellites has exploited advantages for United States military forces, making them the true remaining military superpower today. Protection of these space-based assets is vital to maintaining these corporate and military advantages.

As the United States political and military leaders explore weaponizing space to protect these vital space-based assets, many questions arise. What is the threat to space-based assets? What are the options to counter those threats? Is the diplomatic instrument of power a viable option? These are a few of the questions I look to explore in this paper.

As a military officer, I concur the most direct method to protect our space-based assets is space weapons. However, the consequences of space weapons are significant. My purpose here is to explore diplomacy as an alternate option. The United States' leadership in the international community requires we take risks to achieve peace. Which risk is greater – weaponizing space that may create an arms race resulting in space debris, negating use of space after a conflict in space or reaching agreement not to weaponize space, with associated verification procedures, to avoid economic impacts of replacing damaged systems and space debris? I advocate attempting the diplomatic method as the United States leads the international community into the twenty-first century.

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PREFACE

Why would an Air Force Civil Engineer write a paper about weaponizing space? Foremost is a simple desire to learn more about space. Space is a vital area to both civilian and military organizations desiring to exploit new areas to advantage, commercially for profit in the corporate world or to enhance military force capabilities, in the future.

Upon my arrival to Army War College I desired to learn something new during my year of academic study. There were many aspects of the Civil Engineer career field that I could have studied but being a Star Trek fan (not a Trekie!) and given the above situation I decided to explore this new area. I found the Space Commission report released in January 2001 to explore the United States' direction on space policy and management. Then I talked to leaders at Air Force Space Command in Colorado Springs, Colorado and at Headquarters Air Force in the Pentagon. From these sources I learned about the Air Force's efforts to implement the recommendations of the Space Commission.

The prospect of placing weapons in space and protecting space assets to avoid the "Space Pearl Harbor" talked about in the commission's report intrigued me. Many papers written about this subject take the military point of view that we "must" use force to protect our military and commercial assets in space. Since the Army War College is preparing its students to be strategic leaders who understand the political environment beyond the military I wanted to explore other options to achieving this objective. Were the political and military leaders not confident in diplomatic methods to prevent space weaponization or did the diplomatic process not have value? Thus, my effort to explore the Geo-Political Aspects of Weaponizing Space was born.

It is only appropriate to acknowledge individuals who helped me in this effort. From an academic point of view, Colonel Rick Jones as my advisor provided direction on topic focus and challenged me to take a position regarding weaponizing space. This gave me the courage to take a stand opposite of the military community and explore my true feelings.

From a family standpoint, I must thank my wife Karen who has been my strongest supporter since we started dating in 1977. As we celebrate our twentieth wedding anniversary this spring I am eternally grateful to her for her gentle guidance and strong push to help me develop in every manner. My son Ben, who remained in Great Falls Montana this year to finish his senior year of high school showed me great courage in separating from the family a year early. My other children, Karl and Georgia, constantly kept my focus on the family as we golfed, bowled, camped, played numerous games, and watched television and movies together. After four years as a commander with the long hours, this focus on family has brought me back to reality and my senses regarding what is truly important in this world. I am extremely proud of each of my three children and I am confident they will grow up to be excellent adults.

And of course God – my savior, advisor, and confidant. Thanks for giving your Son and talking to me daily, even when I am distracted and not talking back. The growth of being a youth group counselor and camp director these past eight years has helped me realize that children are vital to America's development and continued leadership in the international community. Now we just have to decide what direction you want me to take when I grow up (retire and start a second career).

GEOPOLITICAL ASPECTS OF WEAPONIZING SPACE

We seek peace, knowing that peace is the climate of freedom.

-- President Dwight D. Eisenhower

EXPLOITING SPACE FOR MILITARY PURPOSES

Space, the final frontier. As man expanded his horizons beyond land to the sea then to air, he dreamed of exploring space. Since the first space launch in the 1950s, the United States (US) outwardly advocated using space for peaceful purposes. President Eisenhower was the first to see the danger of weaponizing space so he balanced the need for information about the Soviet Union's activities with limiting US government expenditures and preserving civilian control of national assets.¹ This set the course for US Space Policy over the next decade. After ten years of negotiations,² the US and Soviet Union signed the Outer Space Treaty (OST) of 1967 which prohibits placing Weapons of Mass Destruction (WMD) in orbit or outer space or using any celestial body for basing of military forces or testing of any type of weapons.³

Also, since the 1950s, the US and many other countries have been taking advantage of technology advances to use space for military purposes. These purposes include communication, navigation, imagery, and weather forecasting. Specifically these entail: (1) communication between forces on the ground or between headquarters and field units to resolve problems created by features or the shape of the earth; (2) augmenting navigation with Global Positioning Systems to track location of units on the ground or at sea; (3) providing imagery for intelligence gathering to track movements or activities of enemy forces or for targeting; and (4) assisting weathermen to track storms or predict near-term conditions to assist timing military operations.⁴

A lively debate exists regarding whether space has been militarized or weaponized, and if space has only been militarized, should it be weaponized.⁵ The difference between militarizing and weaponizing space is the first uses assets in space to enhance capabilities of military forces on the ground, sea or in the air such as stated above. The second uses assets in space to either defend assets or territory from attack or attack assets either in space or on the ground.⁶ Using these definitions, space has been militarized to take advantage of technology advances. Using the same definition, space has not been weaponized. However, according to General Fogelman, former Air Force Chief of Staff, the US is coming very close to being able to place a weapon in space using this second definition.⁷ Thus, the debate of placing weapons in space is very timely.

In this paper, I specifically advocate not weaponizing space. I'm not ignoring the importance of space or the vulnerability of space-based assets. I will consider those concerns as well as the broader geopolitical aspects of weaponizing space. I argue that the costs exceed the benefits. Thus, I advocate the US take the lead negotiating a new international treaty to prohibit all weapons in space. This can entail renegotiating the current OST or developing a new treaty.

I will explore this issue in several parts. First, I will discuss the vulnerability of space-based assets and the two methods to achieve space control. Second, will be an examination of the current US policy and pressures for change. Third, will be an examination of the current international treaties in force with a light toward unique features that makes me think my position has merit. Finally, I will use the Army War College model of international, state and actor level of analysis to explore the reasons and impacts of weaponizing space.

SPACE ASSET VULNERABILITY

As technology has developed, space has become invaluable to both the civilian and military sectors. The value of space to the civilian sector has grown exponentially. As of 6 July 2001, there were 49 different countries with a total of 2,732 satellites and 93 probes in space.⁸ The world's annual investment in space systems grew 50 percent, from an estimated \$79 billion to an estimated \$117 billion, from 1997 to 2001. In 1996, the US spent more on commercial space systems than on military space systems, and that trend is continuing. With the miniaturization and digitization of technology, space systems are becoming less expensive, allowing more countries to achieve space capabilities.⁹ With more countries exploiting space capabilities, the world economic situation is continuing to improve. The US government estimated in 1998 that by the year 2000 the space industry would generate over \$122 billion annually in the US alone.¹⁰ Thus, revenue exceeds investment, making space a moneymaking venture.

The peaceful value of space is not simply to the commercial sector. It has tremendous value to the scientific, medical, and diplomatic communities as well. Ms. Patricia Mische provided eight excellent uses of space for peaceful purposes in her address to the Global Network's "Space for Peaceful purposes" conference. Each serves the humanitarian interests of the entire global community. These uses are:

- "The use or the placement of communications systems that would bring all of us on the planet closer together.
- Space-based medical research leading to possible new cures for human diseases.

- The satellite monitoring of Earth's land, water, and air systems to help control pollution, prevent deforestation, and in other ways to protect earth's fragile biosphere.
- The development and placement of early warning systems for sensitive food and agricultural areas, to help increase food production, and prevent desertification and the other ravages that leads to hunger in places like Africa.
- New methods for locating mineral resources.
- Weather monitoring and storm alerts.
- Satellite-aided search and rescue mission to locate and help save the lives of victims of air, land, and sea disasters. That kind of cooperation is already going on.
- And, of course, satellite certification of arms control compliance, to enhance national and global security.”¹¹

The value of space to the military sector has also grown exponentially. Space-based information is now central to every facet of war.¹² From intelligence, to planning, to operations that include targeting, and more, space systems are invaluable to military success. Use of space systems during DESERT STORM proved they could achieve operational and tactical impacts as well as strategic impacts.¹³ The speed and efficiency that coalition forces were able to prosecute the campaign showed the value of space-based assets.¹⁴ Lieutenant General DeKok, Vice Commander of Air Force Space Command, noted this provides US forces the best possible situational awareness, an unmistakable advantage on the battlefield.¹⁵

The importance of space assets to the military and civilian sectors makes it apparent that they are high probability targets in time of war. According to Congressman Mac Thornberry of Texas, most Americans do not understand how dependent we have become on space.¹⁶ This is so critical that General Fogelman noted agreement by all the commissioners on the Space Commission study in 2001 that “we are going to see conflict in space.”¹⁷ Taking away the ability of the US to utilize its space assets would have dramatic impacts on our capability to prosecute military operations. It would also have serious impacts upon the political, economic, military, and information instruments of power.¹⁸ Given the fact that the exact location of any satellite is easy to predict and technology exists to interrupt or destroy those assets in space or associated components on the ground, space-based assets are vulnerable to enemy attack. Thus, the US is looking at Space Control, the ability to use space assets freely and deny the ability of the enemy to disrupt such use, as a key objective.¹⁹

The threat to space-based assets is changing rapidly. From the 1950s to the early 1990s, the only country capable of attacking US space-based assets was the former Soviet Union.²⁰

Today, a number of states seeking superpower status, such as China, and rogue states seeking to be major actors on the international stage, such as North Korea, could have that capability.²¹ Senator Bob Smith of New Hampshire noted those states have weapons to include lasers, anti-satellite weapons, and electromagnetic pulse weapons that will impact space control and we must not ignore that threat.²² In addition, terrorist groups could acquire or purchase such systems to influence the international environment.²³

Lieutenant General Roger G. DeKok noted to the Air Force Association National Symposium that "dependence equals vulnerability and it creates a military imperative to ensure those wonderful capabilities that we produced are adequately protected and defended."²⁴ The question is whether the US can achieve space control by any other method than military force?

SPACE CONTROL

There are two ways to achieve space control. The first is to physically protect those assets to make them impenetrable to attack. According to Air Force Space Command Vision 2020, Space Control has four components.²⁵ These are: (1) surveillance of space to achieve 100% identification of enemy forces in real time, (2) self-protection of space-based assets via passive and active methods, (3) assure access to space via space lift for satellite operations, and (4) negate use of space via lethal or non-lethal means to destroy, disrupt, delay, degrade or deny those assets to the enemy. However, a 100 percent impenetrable defense is impossible for two reasons. First, the constant and predictable orbit of space assets makes them extremely vulnerable. Protection would require a complex network of defensive assets to prevent attack by either kinetic or non-kinetic means. Second, the already existing plethora of space debris, 6,170 items as of 6 July 2001,²⁶ threatens space assets and could increase exponentially with the use of space weapons to kinetically destroy space assets. In addition, one method of destroying or disabling space assets is putting more debris in space at critical orbits.²⁷ The challenge will be preventing damage from both existing debris and new. This will require a great array of tracking mechanisms to detect and project the orbit of debris and assets. Also under study are ways to remove debris from space,²⁸ a very challenging task.

The second method to achieve space control is to reach agreement internationally to prevent development and fielding of space control means. This is extremely complex in today's strategic environment defined with one superpower along with numerous states and terrorist groups desiring asymmetric means to deny their enemy's strength. Asymmetric means extend to a desire to impact space assets to degrade their capabilities.

The inevitability of weapons in space has been the subject of many articles. The pro argument notes that since man's beginning he has used technology to his advantage to control whatever medium he can reach. This is true of land with guns, cannons, rockets, etc. This is true of the sea with boats, gunships, submarines, and aircraft carriers. This is also true of air with reconnaissance, machine guns, rockets, jet engines, and now stealth and precision weapons. However, Peter Hayes and Karl Mueller argue this concept is too simplistic to provide much insight about how countries may weaponize space.²⁹

Lt Col Thomas D. Bell noted that "the US never wants to fight a war from a position of technical parity or inferiority." He realizes technical superiority varies and has no guarantees. He advocates that space weaponization provides the US the asymmetric technology required to win the next war and the only remaining question, in his view, is when will the US weaponize space.³⁰ Since the 1950s, the US has continued a strong research and development program to develop weapons to protect space assets. Major William L. Spacy detailed the full gamut of directed energy and direct impact weapons in his study entitled "Does the United States Need Space-Based Weapons."³¹

Lt Col Bruce DeBlois notes militarization and/or weaponization of space is not an all-or-nothing affair. He advocates that a flaw exists in the basic assumption of space weapon inevitability. This is that high level political leaders, and not senior military leaders, will make the decision to put weapons in space. He offers four issues for consideration. First, space weapons are incompatible with US constitutional values, so we must maintain the moral high ground even if that means accepting risks. The US followed this policy many times while accepting the associated risk, for example when not responding in kind when Russia fielded an operational anti-satellite capability. Second, no political will exists for weaponizing space. The current national policy is to restrict space to peaceful purposes, thus no legitimacy exists for the military to pursue space weapons. Third, treaty limitations as many treaties are interconnected. DeBlois notes that the OST of 1967 does not directly prohibit non-WMD weapons in space. However, others may see US pursuit of space weapons as pursuing prohibited anti-ballistic missile (ABM) systems. Fourth, international opinion of both allies and adversaries will see any US action to field space weapons as provocative. This could result in a space arms race as others strive to achieve the same capability and could also impact or destroy alliances or coalitions necessary for future operations.³²

Lt Col DeBlois also presents a number of practical considerations as sound reasons why not to weaponize space. They are that space weaponization strategies "lack the element of survivability, maintain a bogus center of gravity, are provocative, are escalatory, are militarily

self-defeating, are politically self-defeating, are not a panacea, are expensive, are a single-point solution, and are not the only solutions.³³

The US action on 13 December 2001 to withdraw from the ABM Treaty will negate concern about violating the ABM Treaty—if the US is not a signatory to the treaty it cannot violate the treaty. However, I contend the intent of the OST would still exist, to prevent any weapons in space, and any action to field a weapon system would be a violation. In the early 1960s, technology did not exist for directed energy or direct impact weapons in space. Thus, the OST was limited to WMD that frequently meant nuclear. Using the broader interpretation of WMD as anything that can achieve an impact beyond a typical weapon, I contend the directed energy and direct impact weapons of today violate the OST.

UNITED STATES NATIONAL POLICY

Space science, like nuclear science and all technology, has no conscience of its own. Whether it will become a force for good or ill depends on man, and only if the United States occupies a position of pre-eminence can we help decide whether this ocean will be a sea of peace or a new terrifying theater of war.

— President John F. Kennedy

As I will show in this section, the US policy is to use space for peaceful purposes while maintaining space superiority. President Kennedy was the first to set a clear overall vision and direction for an integrated civilian and military US space program.³⁴ It has remained consistent over the past 40 years, even with the change in administrations in the office of the President of the United States (POTUS). However, the current debate over space-based weapons, given the lack of a rival superpower with ambitions of rogue states and terrorist groups, has the potential to drastically change this policy. The following discussion provides an insight into the US space policy to encompass various policy and legal documents along with vision from several US leaders. Examining current US space policy at multiple levels provides an insight into future directions of research and development of space and space related systems. Finally, examining current congressional efforts and thoughts regarding space reveals where the US maybe headed in the future.

NATIONAL POLICY

To be prepared for War is one of the most effectual means of preserving peace.

— President George Washington

The National Aeronautics and Space Act of 1958 (42 U.S.C. 2451(a)) established the National Aeronautics and Space Administration (NASA) and outlined responsibilities for space programs between NASA and the Department of Defense (DOD). As an overall policy, the act states that “it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind.” Congress assigned responsibility to NASA, a civilian agency, for the general welfare and security of the US regarding aeronautical and space activities, except for all activities regarding weapons systems, military operations, or the defense of the US, which shall be the responsibility of the Department of Defense. Congress also assigned POTUS the responsibility for assigning determining activities to each agency.³⁵ The main vision of the act was space flight and exploration with use of satellites to maximize the commercial benefits of space.

The Presidential Directive on National Space Policy of 1988 clearly lays out the direction of future US space efforts with a stated commitment “to the exploration and use of outer space for peaceful purposes and for the benefit of all mankind.” Three of the six overall goals reference using space to enhance national security. In detailing the National Security Space Policy, it states “the United States will conduct those activities in space that are necessary for national defense.” The specific goals are “(1) deterring, or if necessary, defending against enemy attack; (2) assuring that forces of hostile nations cannot prevent our own use of space; (3) negating, if necessary, hostile space systems; and (4) enhancing operations of US and Allied Forces.” In laying out seven principles that the US will follow in conducting space activities, all consistent with the Outer Space Treaty of 1967, it defines *peaceful purposes* to include “activities in the pursuit of national security goals.”³⁶

The DOD Space Policy of 1999 states in paragraph 4.1 that “Space is a medium like the land, sea and air within which military activities shall be conducted to achieve U.S. national security objectives.” It goes on to state the primary DOD goal is to provide operational space capabilities to ensure that the US has the space power to achieve its national security objectives. This includes access to space; right of self-defense; deterring, warning, and defending against enemy attack; enhancing the operational effectiveness of military forces; and ensuring the ability to operate in space.³⁷

The President’s National Security Strategy (NSS) is very clear on the US’ position in regards to maintaining space superiority. President Clinton stated in the December 2000 NSS a commitment to maintaining US preeminence in space. He goes on to say that “unimpeded access to and use of space is a vital national interest – essential to protecting U.S national security, promoting our prosperity, and ensuring our well being.” President Clinton’s direction

has four components. First to deter and counter, if necessary, threats to our use of space. Second, maintain the ability to counter space systems aimed at hostile intent against U.S. people or property. Third, maintain technological superiority in space systems. And finally, continue efforts to prevent the spread of WMD to space and “continue to pursue global partnerships addressing space-related scientific, economic, environmental, and security issues.”³⁸ This fourth component is important as it means the US will continue in the leadership role regarding the diplomatic community toward space use.

A telling fact of any administration’s intentions is the federal budget. President Bush campaigned in 2001 on providing the military the tools necessary to execute their mission while transforming the military to a lighter and less expensive force to pay for this weapons acquisition. The Fiscal Year 2003 budget submittal has a \$40 billion increase for the military. While this is a direct result of the terrorist attack on New York City and Washington D.C on 11 September 2001, it has components to improve space capabilities. However, the push to fund a Missile Defense system starting FY 2003 was already a priority, with budget forecasters expecting the military budget to grow \$200-300 billion from 2002 to 2007. This all shows the administration’s emphasis on space capabilities to protect America and support the military troops on the ground, at sea, or in aerospace.³⁹

As shown in the preceding paragraphs, a decisive change occurred within the last decade regarding US use of space. With the dissolution of the Soviet Union and the lack of another superpower threat, the US has stated in clear terms it desires space superiority to include using physical means to obtain space control. While the US leadership has verbally supported continued use of space for peaceful purposes, its policy documents no longer make such statements.

PRESSURE FOR CHANGE

Senator Bob Smith of New Hampshire is a strong space-based weapons advocate. In a presentation to the Center for Security Policy Roundtable on 11 December 2000, Senator Smith stated two programs are missing to achieve true space power. These are a space control capability and a flexible power projection capability such as a space-based laser or space plane. He is very critical of the administration for not providing adequate funding to fully research and develop these space-based capabilities. Taking matters into his own hands he advocated for and succeeded in commissioning the Space Commission.⁴⁰ The purpose of the commission was to explore ways to improve space program management from a multi-agency and service

perspective.⁴¹ Senator Mac Thornberry of Texas also feels weaponizing space is the right thing to do and that leaving our space assets unprotected just doesn't make sense.⁴²

Not all legislators share the same views as Senators Smith and Thornberry. United States Representative Dennis J. Kucinich proposed the Space Preservation Act of 2001 (H.R. 2977) on 2 October 2002. This legislation would preserve the cooperative and peaceful use of space by prohibiting the US from basing weapons of any type in space. In addition, it would require the president to take action to obtain a world treaty banning space-based weapons.⁴³ Representative Kucinich noted in a separate discussion that there is not a true peace benefit from the cold war. There is only a ceaseless arms race that rides the newest technological wave, drains our natural resources, continues to create fear at home and abroad, continues to make the world less safe, and diverts critical dollars from aiding the starving, impoverished, and homeless people of the world.⁴⁴

Representative Kucinich is not alone. Senator Charles Robb from Virginia, a member of the Senate Armed Services Committee, feels that developing space weapons would be a "mistake of historic proportions" because it would trigger an arms race in space. Other states would develop space weapons to counter those of the US. Then the US would have to develop intricate countermeasures.⁴⁵ Colonel (Ret, USAF) Sam Gardiner, a war gaming expert, notes that "if you defend the satellite, you widen the war" such that the solution becomes the problem.⁴⁶ Even General (Ret, USAF) George Lee Butler, former Commander of Strategic Air Command, noted after having seen all 12,500 targets for US nuclear warheads that it must be our number one priority to stop this arms race as "deterrence is a formula for disaster."⁴⁷ These statements show the temperament of key leaders in the U.S. Congress and military is split regarding space-based weapons, thus, no national will exists to develop them.

INTERNATIONAL TREATIES

A starting point in examining the possibility of an international agreement to ban space weapons must begin with examining the multiple international legal agreements impacting space and weapons systems already in place. Understanding the intent and scope of treaties enacted provides a background on how space use has been restricted to date and the success of verification procedures. In this chapter I will explore the various treaties enacted over the past 40 years that seek to protect a region for peaceful purposes, restrict weapons developed or testing, and those that setup detailed verification procedures. This will show that restricting the use of a region or area for peaceful purposes or reducing weapons with verification procedures is not new.

TERRITORY RESTRICTION

The Antarctic Treaty of 1961 was the first international treaty to restrict the use of a geographical area to peaceful purposes. Article 1 states use of Antarctica shall be only for peaceful purposes, prohibiting any measures of a military nature "...such as the establishment of military bases and fortifications, the carrying out of military maneuvers, as well as the testing of any type of weapons." It allows use of military personnel or equipment for scientific research or other peaceful purposes. Thus, this treaty restricts claims of sovereignty, restricts use to scientific purposes even prohibiting the explosion of a nuclear weapon, and requires sharing of data or findings from research.⁴⁸

This treaty is significant in showing countries can reach international agreement, and comply with that agreement, to limit militarization or weaponization of an area. The signatory countries recognized the value of scientific exploration on and around the Antarctic continent to expand the knowledge of the international community. To date, many countries have cooperated in international scientific studies that have greatly benefited mankind. It requires mentioning that Antarctica is of minimal value militarily. Thus, there has been very little pressure exerted to weaponize the region.

The Outer Space Treaty of 1967 was the second international treaty with the focus of limiting use of a geographical region, this time space, to peaceful purposes. The treaty prohibited placing any WMD in orbit around the earth or in space and prohibited any country using any celestial body, to include the moon, for military purposes to include military basing or fortifications or testing of any weapons of any kind.⁴⁹ Mr. Craig Eisendrath, a former US State Department officer who was a key player in creating the OST, noted that the original intent of the treaty was to keep space entirely weapons-free. The US had hoped to de-weaponize space before it got weaponized but others on the US team with separate agendas prevailed in strictly limiting the OST to preventing nuclear weapons in space.⁵⁰

This treaty is significant in that it set boundaries for use of a region, space for peaceful purposes, and specifically limited basing weapons in that region, no WMD in orbit or any weapon on a celestial body. The success of the treaty is amazing in that the treaty does not include verification methods beyond national technical means. However, all countries are aware that the US tracks every item in space, currently at 8,995 items from satellites to space debris the size of an astronaut's glove.⁵¹ Thus, specific verification provisions were unnecessary.

Is the OST the most abused treaty to date? Forty-nine countries have put 2,732 satellites in space which support military operations in various fashions across imagery, communication,

navigation, and weather forecasting. The problem is that since the OST did not define peaceful purposes, each country applied its own definition. General Fogelman stated in 2001 that the US has certainly militarized space, however we have not weaponized space.⁵² The question is where should the international community draw the line between militarizing and weaponizing space?

WEAPONS RESTRICTIONS

The Limited Test Ban Treaty (LTBT) of 1963 was the first treaty seeking the "...speediest possible achievement on general and complete disarmament under strict international control..." per the preamble to the treaty. The focus, detailed in Article 1, was to stop the testing of nuclear weapons in international environments to include space, sea, and air where radioactive contamination could extent beyond the borders of the testing country.⁵³

Was this treaty the first effort in environmental control for public health benefits? It did keep radioactive debris from getting into the water and air environments that support human life. But this was a byproduct of the treaty and not an original intent. The intent was to limit testing nuclear weapons to prevent the technology from expanding to more destructive weapons. This would stabilize the stockpiles of weapons in the hands of the major superpowers. At that point, stockpile reductions through arms reduction talks could proceed to achieve the first steps toward disarmament.⁵⁴

The Anti-Ballistic Missile Treaty (ABMT) of 1972 recognizes that effective measures to limit ABM systems are a significant step in curbing the strategic offensive arms race, thus reducing the risk of war. It specifically limits any signatory country from deploying an ABM system, defined as interceptor missiles, launchers, or radars, for defense of the territory of its country except for two exceptions. The exceptions are (1) one system having a radius of 150 kilometers centered on the nation's capital and (2) one system having a radius of 150 kilometers and containing Intercontinental Ballistic Missile (ICBM) silo launchers.⁵⁵

The intent of the ABMT was to prevent one country from negating the missiles of another country by having a defensive system in place. This was another step to curb the arms race by eliminating the need to produce enough missiles to inundate an adversary's ABM system to allow some warheads to get through to their intended targets. To ensure no ABM system was fielded outside the terms of the treaty, deployment of missiles, launchers, and radar was specifically defined as any system that is operational, mothballed, under testing, or under maintenance and repair.⁵⁶ Verification procedures were not a part of the ABMT; this complicated either side making accusations against the other of treaty violations. The US has

specifically stated the former Soviet Union used authorized ABM components to field a National Missile Defense system,⁵⁷ but they did not call it a violation. The POTUS administrations since President Nixon have viewed the ABMT as strategically stabilizing, permitting significant reductions in nuclear arsenals and preventing an arms race in defensive and space weapons systems.⁵⁸

The Intermediate Range Nuclear Forces Treaty (INF) of 1988 eliminated an entire series of theater nuclear missiles deployed in Europe and western Soviet bloc countries during the mid to late 1980s. These were all intermediate and shorter range missiles with ranges between 500 and 5,500 kilometers.⁵⁹ Two things are significant about this treaty. First, eliminating an entire series of missiles from Europe at the height of the nuclear arms race instead of establishing ceilings.⁶⁰ Second, the implemented verification and elimination protocols were the most extensive to date. For a period of thirteen years, both countries could inspect the other country's facilities under four types of inspections. These included baseline inspections to confirm initial data, closeout inspections at facilities and missiles operations bases, short-notice inspections of declared and formerly declared facilities on a quota basis, and elimination inspections to confirm status with elimination protocols.⁶¹ This thirteen-year period ended in May 2001 without a significant event occurring during the inspection period. This proves the value and capability of verification procedures.

The Strategic Arms Reduction Talks (START) Treaty of 1994 required significant reductions in the numbers of deployed strategic nuclear warheads and delivery vehicles to include Intercontinental Ballistic Missiles (ICBMs), Sea Launched Ballistic Missiles (SLBMs) and manned bombers. The reductions were set forward in three phases to be completed within seven years. The START Treaty itself remains in effect for 15 years to ensure maintenance of maximum levels and to allow negotiation of further START treaties. START I reductions were 30-40 percent of previous levels, specifically, setting the limit of delivery vehicles to 1,600, the total number of strategic nuclear warheads to 6,000, and the number of ICBM and SLBM strategic nuclear warheads at 4,900.⁶²

In developing the START Treaty, the US and USSR recognized "that nuclear war would have devastating consequences for all humanity, that it cannot be won, and must never be fought." The signatory countries believed the treaty would reduce the risk of nuclear war and strengthen international peace and stability.⁶³ This treaty was the culmination of many other treaties to stop the nuclear arms race and initiate actions to reduce the nuclear stockpiles of the two major superpowers. While negotiations are complete for the START II Treaty, only Russia

has ratified the treaty. Negotiations for START III are stalled due to recent political events centered around US ABMT withdrawal.

The Comprehensive Nuclear Test Ban Treaty (CNTBT) of 1996 put in place a systematic and progressive framework to eliminate nuclear weapons on a global scale and eliminated nuclear weapons testing of any kind. This last step was important given the LTBT of 1963 had not eliminated underground nuclear weapons testing. Specifically, the treaty states each party will not "carry out any nuclear weapons test explosion or any other nuclear explosion, and to prohibit and prevent any such explosion at any place under its jurisdiction or control." The treaty details 44 pages of explicit verification procedures to allow signatory countries to ensure all other countries are in compliance.⁶⁴ This once again proved the value of verification procedures.

FUTURE FOCUS

We are at the dawn of a new century. Now is the moment to be farsighted as we chart a path into the new millennium.

-- President William J. Clinton

President George W. Bush stated throughout 2001 that the world environment has drastically changed since the signing of the treaties in the 1960 and 1970s.⁶⁵ The treaties discussed above were signed at a time when there were two superpowers vying for control of the world. It was the ideological struggle of democracy versus communism. Each superpower aligned itself with states of a similar political nature, the US with the North Atlantic Treaty Organization and the Soviet Union with the WARSAW Pact. Today, the Soviet Union has dissolved along with the WARSAW Pact. Many of the former WARSAW Pact states are now developing democratic political structures with the majority vying for NATO membership. Russia also desires NATO membership, even with their special status on the NATO-Russia Permanent Joint Council.⁶⁶

President George W. Bush's announcement on 13 December 2001 to vacate the ABMT could have serious international impacts. Two options could result since the intent of the ABMT was to prevent one side from gaining a significant advantage over the other by fielding an ABM system. One is a free-for-all on fielding ABM systems by numerous states to counter the US capability. The other is an arms race of offensive missile systems. The failure of the Soviet Union combined with Russia's struggle economically, politically, and militarily has left Russia with only its strategic rocket forces to influence the international community. Russia fears rocket forces neutralized by US ABMs and a nuclear buildup by China, with many of its missiles

pointed at Russia, is a threat to its security.⁶⁷ However, so far Russia has accepted the US withdrawal calmly since President Bush simultaneously announced his intent to reduce US strategic missiles beyond those of START III to between 2,200 and 1,500 warheads.⁶⁸

General Eberhart stated there is nothing preventing weaponization of space.⁶⁹ He is technically 100 percent correct. The OST only prohibits deploying WMD in space; it allows deploying non-WMD weapons. The ABMT also prevents deployment of an ABM system for NMD. Ambassador Grey, US Representative to the United Nations Council on Disarmament, has repeatedly stated the US system under development is not a defense for strategic ballistic missiles from China or Russia. It is to defend against the new threat posed by rogue states or terrorist groups.⁷⁰ To defuse this confusion, the US chose to withdraw from the ABM Treaty.

The question to wrestle with regarding deploying space-based weapons is, does the current US policy violate the intent of the OST? On 1 November 1999, the United Nations (UN) General Assembly passed a resolution entitled "Prevention of an Arms Race in Outer Space" by a vote of 168-0, with two states abstaining – the US and Israel. The resolution was significant as it reflected the growing international consciousness that space must not become the next area of military warfighting operations.⁷¹ The UN now faces the challenge of strengthening the OST to expand the prohibition of weapons beyond just WMD to all weapons in the face of US objections. Just as President Bush stated the world environment has changed regarding the ABMT, strengthening the OST would also recognize the changing world environment since 1967 regarding the danger of space weapons. In 1967, the major weapon of fear was WMD, partly because of the misunderstanding of the long-terms effects since the weapon was new and because of its destructive nature. Weapons system research and development since that time has greatly increased the destructive capability of non-WMDs. Thus, is it time to strengthen the OST to prevent deployment of any weapon in space?

ANALYSIS

The debate to weaponize space is one of the toughest that both the national and international environments will face for many years. For almost 50 years, through both national policy and international treaties, the use of space has been limited to peaceful purposes. The initial reason was because technology did not foster weaponizing space. The agreement to restrict space use to peaceful purposes further fostered this limitation.⁷²

Today the pressure is stronger than ever to weaponize space. The 1990s saw exponential use of space to support military operations, far beyond that previously experienced. Operations in Kuwait (1991), Northern Iraq (1991), Bosnia (1995), Kosovo (1999), and now

Afghanistan (2001) have each radically advanced use of space assets for military purposes.⁷³ Thus, we have confirmed the value of space assets to military operations and the requirement to protect those assets.

The military community is a strong advocate for deploying space weapons to protect space assets through space control.⁷⁴ To this end, US and DOD policy and strategy treat space just like any other medium. Many in Congress also strongly support fielding space capabilities. To this point, they sponsored the Space Commission to recommend ways to improve the national space effort, to include exploring creation of a separate space service. The commission foresaw a space Pearl Harbor in the future if the US does not continue to advance its space capabilities to prevent another country from surprising us in an asymmetric attack.⁷⁵ Congress agreed to hold off creating a separate space service as long as DOD implements recommended changes and puts proper focus on space capabilities. The SECDEF acted quickly to endorse the commission's recommendations and the Air Force is moving quickly to implement those recommendations.⁷⁶

The question is which direction will the US take to achieve space superiority given the current fiscal environment. The national debt now requires an increasing and significant portion of the annual federal budget to pay the interest on the debt. This prevents taxpayers from spurring economic growth through consumer spending or the government from stimulating the economy through expenditures such as funding social programs or military forces required in this new world environment.

POLITICAL ANALYSIS

The Army War College uses a model to explore the three levels of analysis as a framework for the study of international politics. These three levels are the international system level, the actor level, and the decision-making level. These are defined as

(1) International system level – emphasizes the external influences on actor's decisions and behavior. The major factors are power and security as it relates to survival. This drives states to align with other states in a balance of power struggle to gain equilibrium necessary to deter or deal with an assault.

(2) Actor level – emphasizes the internal characteristics or factors, as they are different or particular from one another. States that display similar features, such as democratic or revolutionary tendencies, tend to group together to support common interests.

(3) Decision-Making level – emphasizes the flesh and blood decision-makers that participate in the formulation and implementation of policy, specifically, how they steer the process direction.⁷⁷

Application of the model yields the following results regarding weaponizing space. At the International system level, states are concerned with power. Space-based assets provide the US a tremendous advantage in military operations due to the increased information available. Thus, protecting these assets is vital to the US in maintaining that advantage. United States and DOD space policies support this as do Congressional space advocates. States without space superiority or space assets at all will either seek to acquire them or align with others who possess them. This results in a great space arms race. The US will field space weapons first since they are already near technological deployment. The technological hurdles the US overcomes will help others acquire those systems much faster. Thus, the US will struggle to maintain space superiority into the future, constantly striving for the next technological advance.

STRATFOR, an intelligence and strategy development planning think tank, published an article entitled “US Has Most to Lose in Space Arms Race – Pentagon Space Effort will Draw Competitors.” The article predicts the results at the international level almost exactly as I have. They see the bottom line as the international community unable to stop the US from weaponizing space, thus, they will join in the quest. The US will lead the arms race, where both high- and low-tech weapons will proliferate. Unfortunately, since the US has the most to gain by maintaining superiority, they will also have the most to lose.⁷⁸

There will be many benefits to the US in protecting its space assets. First, continued economic prosperity for the commercial sector as they operate information systems at reduced cost without fear of disruption or destruction. Many would contend those corporations should bear this fiscal burden, but that is beyond this paper. Second, the advancement of peaceful research in medicine and other areas noted earlier. Third, the increase in US military power from the use of these assets to enable forces on the ground, at sea, or in the air.

However, there are numerous impacts of the ensuing arms race. First, this will require massive budgetary expenditures to develop and field space-based weapons. Second, loss of technological superiority as trailing countries will do what's necessary to maintain parity. Third, lost opportunity cost of other potential budget expenditures. As the US undertakes the Global War on Terrorism, nation building in numerous failed or failing states could become a resulting responsibility, just like in Afghanistan today. A space arms race will require diverting budget dollars from nation building or resolving many of the domestic problems in America today.

At the Actor level of analysis, the US is a peaceful country willing to compromise to spread democracies across the globe. However, as stated by George Keenan, an American diplomat and scholar, when democracies turn from peace and are compelled to fight they are ferocious.⁷⁹ Thus, my concern is that the US will have a tendency to overreact to the events of 11 September 2001. While the attacks on the World Trade Center in New York City and on the Pentagon in Washington D.C. are nothing short of horrific, I fear America's focus is on retribution for lost lives. It is debatable if space-based assets, let alone space weapons, could have deterred or prevented those attacks. However, the use of space-based assets is critical to the asymmetrical warfare the US and coalition forces are employing in the Global War on Terrorism. The benefits of those assets will foster victory over terrorist groups and rogue states. This push by the US to exploit space will cause adversaries to develop capabilities to defeat our advantage. Thus, the benefits and costs will be similar to situation number one.

The final level of analysis, the decision-maker level, focuses on the POTUS and SECDEF. Prior to his election, President George W. Bush noted his desire to transform the military to be the world-class fighting force required by America and the world for the future. The budgetary surpluses of the previous four years seemed to offer him the opportunity to make this transformation while still funding other issues of concern for the American public. However, the combination of the War on Terrorism with the economic recession will stymie that possibility without resuming budgetary deficits. However, President Bush stated deficit spending will be the case for the next two to three years given the national emergency, recession, and War on Terrorism.⁸⁰ President Bush hired Secretary Rumsfeld as SECDEF because of his previous experience with the military and recent experience on Congressional Commissions regarding National Missile Defense and the Space Commission. Secretary Rumsfeld, like President Bush, will push to support US troops as this terrorism campaign drives on for the foreseeable future. This will require massive budgetary expenditures and could spur an arms race. Again, I see the same impacts as discussed under the international system level above.

GEO-POLITICAL FACTORS

There are a multitude of geo-political factors to consider regarding weaponizing space. It is beyond the scope of this paper to discuss each of them. Thus, I'll pick the top three that in my mind warrant not fielding space weapons. These are international stability, national and international economics, and space debris.

First is international stability. The public US position was the risk of nuclear war created fear in Americans that drove the effort behind the international treaties. The goal being to avoid

a nuclear holocaust. The non-public position was the US government's fear of the Soviet Union quickly catching the US in terms of numbers of strategic nuclear weapons and the technology to deploy them drove the effort. Thus, the US pursued treaties to prevent losing their advantage. Either way, each treaty focused on minimizing the threat of nuclear war in a different manner. These were limiting the tests of nuclear weapons to restrict further development of higher yield warheads, taking away the advantage of an anti-ballistic missile system, and removing or reducing the numbers of specific classes of weapons. Each helped reduce and then eliminate the nuclear arms race, and thus the threat of nuclear war. These efforts achieved incredible results with nuclear delivery warheads now numbering less than 6,000 and negotiations for further reductions underway.

Many people stated the world was on an unstoppable path to destruction when the nuclear arms race began. However, several brave individuals accepted the challenge to develop a diplomatic framework to resolve that potential. Today, we live in a much more peaceful world due to their efforts. Presidents Bush and Putin displayed this cooperation on 11 September 2001 after the terrorist attacks on the World Trade Center and Pentagon. President Putin informed President Bush that he was taking his strategic missiles off alert to further reduce the threat of an accidental launch given the heightened tensions on that day. This international communication and cooperation was unheard of during the past 100 years.

I contend an international effort to avoid placing weapons in space would further stabilize the international environment. As discussed above, international instability results when one state feels another state has excessive power. This is normally military power due to the fear that the other state can attack and defeat their country. Space weapons provide a capability that few states will be able to match due to the high cost of those systems. Without a capability to defend from such attack, states without such systems will feel inferior. This will cause them to reach out for other capabilities to defend themselves. These could be WMD such as chemical or biological. We've seen in the aftermath of the 11 September 2001 terrorist attack the impact such events can have. The Hart office building in Washington D.C. was closed for nearly three months while decontamination of the Anthrax virus took place.

Second, as noted early on, the world has become dependent economically on space-based assets for communication, navigation, weather forecasting, and imagery. Placing a satellite into orbit is a very costly undertaking. But the benefits of space-based assets far exceed the costs. Attacking space assets puts those benefits at risk. Replacing those assets is a costly undertaking with today's space lift capability. Until the cost is significantly reduced, replacing space assets will significantly decrease, and could eliminate the profits. Thus,

economic prosperity demands we avoid this risk. A costly arms race that depletes vital monetary assets of countries for military purposes versus good for the international environment could have lasting impacts. These include missed opportunities to further social programs, replace crumbling infrastructure, and revitalize governance and economic structures in failed or failing states. The world requires a strong US to lead them out of the current crisis, not into another expensive arms race.

Third is the issue of avoiding space debris. Weapons to deny use of space assets operate along the spectrum of disrupting the ability of an asset to perform to destroying the asset into hundreds of pieces. Destruction, as discussed in Major Spacy's article on Space-Based Weapons, can destroy the asset, damage the asset, or simply disrupt its operation.⁸¹ In war, debris from damage or destruction could permeate the realm of outer space. Unlike the lower atmosphere where gravity will pull debris to earth, gravity will not quickly pull this debris to earth. NORAD currently tracks over 8,995 items in space from satellites to objects the size of a glove. Debris size and trajectory determine the time the object will remain in earth orbit. This could exceed decades and thus endangers future use of space. This debris hinders placing additional assets in space and may require replacing damaged assets. Either way, the economic impact could be significant.

CONCLUSION

The international environment has become extremely dependent upon space assets, both militarily and economically. The US is now totally dependent upon these space assets for communication, navigation, imagery, and weather forecasting. The increased advantages provided by space-based assets have further increased our technological superiority militarily. In addition, the economic advantage of these space-based assets has been enormous. The increased technological capability at a reduced unit cost has fostered economic growth over the past 25 years on an exponential scale. Thus, our political and military leaders feel it is important to protect these space-based assets.

Protection of space-based assets is the right thing to pursue. There are two ways to protect these assets. First is militarily with weapons. Placing weapons in space provides the optimum control to defeat an enemy's capability, either prior to or during attack. Our military community has grasped onto this means because the capability exists and is the most likely to succeed. However, there are many ramifications to success. These are a renewed arms race to reduce our advantage, increased asymmetric weapons employment to negate our advantage,

the economic impact of such employment when money is needed in so many places, and space debris that remains in space impacting future use of space for all purposes.

The second method to protect space-based assets is to diplomatically develop an international agreement. This treaty must be explicit in language as to exactly what is prohibited and allowed, include strong verification means to allow oversight by separate states, and significant penalties for violations. This may require incredible bravery on the part of political and military leaders, similar to that displayed by those who undertook reducing the nuclear stockpiles over the past 40 years. However, just like the multitude of treaties to reduce the nuclear arms produced amazing results, this effort can also achieve amazing results such as international stability, economic prosperity and humanitarian efforts taking advantage of the opportunity cost the money saved.

President George W. Bush stated that the new world environment requires a new strategic framework for ABM systems. He is right. The requirement to prohibit ABM systems to deter the superpowers from a nuclear arms race is gone. A new framework to protect the homeland from missiles launched by rogue states or terrorist organizations is required. Similarly, a new framework is required to prohibit space-based weapons. Weapons of Mass Destruction are no longer the only weapon with massive destructive capability. Thus, the best method to ensure peaceful use of space for the benefit of all mankind is updating or replacing the OST.

I advocate the POTUS and his key advisors develop a strategy to avoid weaponizing space. The resulting treaty requires a strong effort between national leaders and UN Ambassadors. The goal would be to prevent placing weapons of any type in space. International law with the international community working together to create a strong deterrent for errant states or groups will be the key to the continued use of space for peaceful purposes.

WORD COUNT = 8,567

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⁷⁵ Commission to Assess United States National Security Space Management and Organization, 8.

⁷⁶ Rumsfeld, entire article.

⁷⁷ John Spanier and Robert L. Wendzel, Games Nations Play, (Washington D.C.: Congressional Quarterly, Inc., 1996): 1.

⁷⁸ STRATFOR, "US Has Most to Lose in Space Arms Race – Pentagon Space Effort will Draw Competitors," on 9 August 2001; available from <<http://www.freerepublic.com/forum/a3b77fb326907.htm>>; Internet; accessed 9 December 2001: 1, 4.

⁷⁹ Spanier & Wendzel, 9.

⁸⁰ George W. Bush, "President Meets with Economic Advisors and Fed Chairman Greenspan," 7 January 2001; available from <<http://www.whitehouse.gov/news/releases/2002/01/20020107-3.htm>>; Internet; accessed on 22 January 2002: 2.

⁸¹ Spacy, 10-32.

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